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Publication Title:

Collapsible container

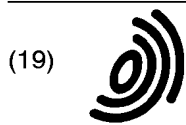
Abstract:

Abstract of EP1241105

A container 10a is stackable on a like container but unable to nest with it. In this example, this first type of container has upright sides. Stacking means are provided to allow this first type of container to support a nesting container which is substantially the same size in plan but has slanting walls (to allow nesting) and therefore has a base which is smaller in plan than the mouth of the first container. The first type of container may be collapsible.

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(54) **Collapsible container**

(57) A container 10a is stackable on a like container
but unable to nest with it. In this example, this first type
of container has upright sides. Stacking means are pro-
vided to allow this first type of container to support a
nesting container which is substantially the same size
in plan but has slanting walls (to allow nesting) and
therefore has a base which is smaller in plan than the
mouth of the first container. The first type of container
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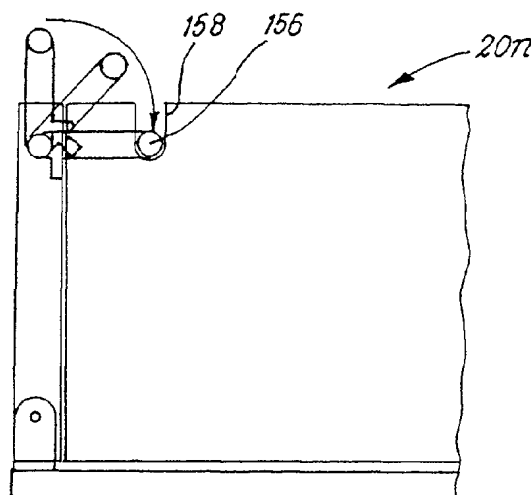


FIG. 14d

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Description

[0001] The present invention relates to containers.

[0002] The invention provides a container which is stackable on a like container but which, at least when the container is in condition for containing goods, is unable to nest with a like container by entering wholly or partially therein, stacking means being provided which, in use, allow the first type container to support a container of substantially the same size in plan and of a second type which is stackable with a second type container and nestable as aforesaid with a second type container.

[0003] Preferably the stacking means comprise a stack member on which the base of a second type container may be supported. Preferably the stacking means are attached to the first type container.

[0004] The first type container may be open-topped. The first type container preferably has substantially vertical sides, at least when the container is in condition for containing goods. The first type container preferably has a base of substantially the same size in plan as the container mouth, at least when the container is in condition for containing goods.

[0005] The stack member may be fixed in position on the first type container, and may comprise a lip around the upwardly open mouth of the container.

[0006] Alternatively, the stack member may be movably mounted to have a stacking position and a stowed position in which a second type container is not supported. The stack member may be received within a recess in the wall of a container when in the stowed position. The stack member is preferably pivotally mounted on the container for movement between the stacking and stowed positions, and may be mounted to pivot through substantially 270° from a position outside the container, to a position overlying the mouth of the container. Alternatively, the stack member may be slidably mounted on the container for movement between the stacking and stowed positions.

[0007] In a further alternative, the stack member may be mounted for movement between the stacking and stowed positions by a combined sliding and pivoting movement. The stack member may be mounted to move from the stowed position to the stacking position by an initial sliding phase followed by a pivoting phase of movement. The sliding movement may be substantially vertical. The sliding phase may move the stack member to a position from which it may pivot out over the mouth of the container to provide a support surface.

[0008] Alternatively, the stack member may be mounted to move from the stowed position to the stacking position by an initial pivoting phase followed by a sliding phase of movement. The sliding movement may be substantially horizontal. The pivoting phase may turn the stack member to an orientation at which it may slide out over the mouth of the container to provide a support surface.

[0009] The stack member may be alongside the out-

side wall of the container in the stowed position, or may be located against the inside face of a container wall.

[0010] Preferably the stack member extends along all or part of the periphery of the container mouth when in the stacking position. The stack member may comprise a bar or flap on which a second type container may be supported.

[0011] Alternatively, the stack member or members may be located at corners of the container mouth, and may be generally triangular.

[0012] The container is preferably collapsible. The container may be collapsible by folding the walls over the base. The container is preferably collapsible when the stack member is in the stowed position. The container may further comprise releasable lock means to secure the walls against collapse. The lock means may be caused to engage by movement of the stack member to the stacking position. The stack member may engage another member when in the stacking position, to secure the walls as aforesaid.

[0013] The invention provides a stackable container on which a like container may be stacked, but with which a like container is unable to nest, the container comprising stacking means which, in use, support a container of substantially the same size in plan and of a stackable and nestable type.

[0014] The container may have any or any combination of the preferred features set out above.

[0015] The invention also provides a stackable container having an upwardly open mouth, and a base supportable at the mouth of a like container to form a stack, but unable to enter the mouth of another like container to nest therewith, at least when the container is in condition for containing goods, there being stacking means which, in use, are able to support a second type container in stacked manner on the first type container, the second type container being of substantially the same size in plan as the first type container and being stackable as aforesaid with a second type container, and nestable as aforesaid with a second type container.

[0016] The container may have any or any combination of the preferred features set out above.

[0017] The invention also provides a container system comprising a plurality of containers and including at least one container of a first type which is stackable with other containers of the first type, but, at least when the container is in condition for containing goods, is unable to nest with another container of the first type by entering wholly or partially therein, and further including at least one container of a second type which is stackable and nestable as aforesaid with other containers of the second type, the containers of the first and second types having substantially the same size as each other in plan and the containers of the first type being in accordance with any preceding definition.

[0018] Embodiments of the present invention will now be described in more detail, by way of example only, and with reference to the accompanying drawings, in which:

Figs. 1a and 1b are highly schematic perspective views of a stack-only and a stack/nest container;

Fig. 2 is a vertical section through a stack/nest container above a stack-only container;

Figs. 3a,b and c are perspective views of one end of an alternative embodiment, and Fig. 3d is a vertical section through a stack/nest container stacked on a container of Figs. 3a to c;

Figs. 4a to c are perspective views of one end of a further embodiment;

Fig. 5 is an enlarged perspective view of one top corner of another embodiment and Fig. 6 shows a variation of this embodiment;

Figs. 7 and 8 are views corresponding to Fig. 5, showing other embodiments;

Fig. 9a is a perspective view of another embodiment, shown partially collapsed in Fig. 9d, and Figs. 9b,c,e and f show corner pieces of Fig. 9a, on an enlarged scale;

Fig. 10 is an enlarged perspective view of the inside corner of a container which uses wedges as stack members;

Fig. 11 is a perspective view of a container which uses swing bars as stack members; and

Figs. 12a and 12b are enlarged perspective views of the inside corner of a further embodiment, and Fig. 12c is a vertical section perpendicular to the stacking bar of the embodiment.

[0019] Figs. 1a and 1b show, highly schematically, two common types of container 10,12 commonly used for delivery of goods to retail premises. The first type container 10 has a base 14, side walls 16 and end walls 18. In the erect condition shown in Fig. 1, the walls 16,18 extend perpendicular to the rectangular base 14 to form a parallelepipedal container with an open upper mouth 20. The parallelepipedal form of the container, when erect, means that like containers of the same size will readily stack on each other. Some designs will provide additional formations around the lip 22 of the mouth 20, and around the edges of the base 14, to enhance the security of the stack so formed. The vertical arrangement of the walls 16,18 means that the base 14 is substantially the same size (in plan) as the mouth 20, and thus the containers 10 will not nest with each other, because the base 14 will be unable to enter into the mouth 20.

[0020] In this specification, the term "nest" is used to indicate containers adopting a compact arrangement by

one container being received wholly or partially within another.

[0021] By virtue of their inability to nest, at least while in their erect condition for receiving goods, and having vertical walls, these containers would occupy the same volume when empty as when full, unless they are provided with an arrangement to allow them to collapse, such as hinging the walls 16,18 to the base, so they can fold down onto the base. It is recognised that the increased compactness of collapsed containers is sometimes referred to as a "nesting factor" but this is by analogy with the compactness achieved by nesting of the type defined above and is not encompassed within the meaning of "nest" as used in this document.

[0022] The container 12 is of an alternative type which is stackable with and nestable (as defined) with containers of its own design. Again, it has a base 24 from which side walls 26 and end walls 28 extend up. However, the main difference between the container 12 and the container 10 is that the walls 26,28 do not extend up perpendicular to the base 24, but rather slope outwardly so that the mouth 30 of the container 12 is larger (in plan) than the base 24. In consequence, the mouth 30 is able to receive the base 24 of a like container, for nesting. This provides compactness during transport while empty. It is therefore not necessary for this type of container to collapse.

[0023] Stacking bars 31 or bale arms allow these containers to stack, and can be stowed when not in use.

[0024] There is a degree of incompatibility between these two types of container. For instance, a container of the second type 12 cannot stack on a container of the type 10, assuming both containers have substantially the same size in plan (and therefore substantially the same mouth size), because the smaller base 24 will nest into the mouth 20 to some degree. This situation is illustrated in Fig. 2, which shows a second type container above a first type container, but both having the same size in plan, and being vertically aligned. As can be seen, there is a gap around the edge of the base 24, between the base 24 and the lip 22, so that the base 24 is unsupported and will therefore move down into the mouth 20.

[0025] Figs. 3a,b,c,d illustrate one embodiment of the invention, in which containers of the first type 10 are modified to allow greater interworking with containers of the second type. The container 10a has a base 14a, side walls 16a and end walls 18a. A slot 32 is mounted at the top of the wall 18a in a manner which allows a combined pivotal and sliding movement, as follows.

[0026] Containers of the types being described would often be rectangular in plan, in which case the longer sides would generally be called side walls, and the shorter sides would often be called end walls. However, the principles of the invention can be applied to containers with side walls longer or shorter than end walls, or with all side walls of the same length, i.e. square in plan.

[0027] The inside faces of the walls 16a carry horizon-

tal slots 34 along which a peg (not shown) at the top of the slat 32 may run. In addition, the peg forms a pivot which allows the slat 32 to turn from the stowed position (Fig. 3a) hanging from the peg, to a generally horizontal position (Fig. 3b) in which the lower edge 36 has swung out from the wall 18a. The slat 32 is then able to slide out over the edge of the mouth 20, by the pegs sliding along the slots 34. As the slat 32 reaches the final position (Fig. 3c) two further pegs 38 enter the open ends of the slots 34 to provide support at four points around the slat 32.

[0028] When in the position of Fig. 3c, the slat 32 provides a surface on which the base 24 of a stackable and nestable container can rest (Fig. 3d) thereby allowing a second type container to stack on a first type container.

[0029] Other types of runner could be provided for the slat 32, such as pegs or projections on the inner faces of the walls 16a, with corresponding recesses or slots on the ends of the slat 32. A slat 32 would preferably be provided at each end of the container 10a.

[0030] With the slat 32 in the stacking position, the walls 16a are braced more securely against collapse. However, when the slat 32 is in the stowed position, it forms the upper part of the end wall 18a, with which it can fold down over the base 14a when the container is to be collapsed as described above.

[0031] Figs. 4a,b,c show a variation to the arrangement of Fig. 3, in which a bale arm 40 is provided at the top of the end wall 18b of a container 10b which also has side walls 16b, the walls 16b, 18b being hinged to a base 14b to allow the container to collapse.

[0032] The bale arm 40 is mounted at the top of the wall 18b to be able to pivot through substantially 270° about a horizontal axis 42 along the top edge of the arm 40, from the position shown in Fig. 4a, to the position shown in Fig. 4b, and as indicated by the arrow 44. In the position of Fig. 4b, two wings 46 are revealed at either end of the bale arm 40, these wings being housed within recesses 48 when in the position of Fig. 4a.

[0033] The walls 16b have a series of sockets 50 formed along their top edge, near their ends. These are complementary to teeth 52 formed on the underside of the wings 46 (see inset to Fig. 4b) so that when in the position of Fig. 4b, the teeth 52 are aligned with sockets 50, allowing downward pressure to engage the teeth and sockets with a snap-fit. This secures the bale arm 40 in the position of Fig. 4c, in which the wings 46 are locked to the walls 16b to brace them against the container collapsing, and the bale arm 40 extends out over the mouth 20b of the container, to provide a surface on which a second type container may stack.

[0034] Fig. 5 shows a further variation of an arrangement similar to Fig. 4. Again, there is a member, in this case a stacking bar 54, which can swing through a large angle of almost 270° from a stacking position (shown in Fig. 5) to a stowed position hanging down outside the end wall 18c. This movement is provided by an in-turned end 56 of the bar 54 which provides a journal mount in

a socket at 58. The bar 54, when in the position of Fig. 5, overlies one edge of the mouth 20c to provide support for a second type container stacked thereon.

[0035] The end wall 18c has a small ear 60 against which an upstand 62 of the wall 16c is trapped when the bar 54 is in the stacking position. Moreover, to reach the stacking position, the bar 54 must be forced past a resilient projection 64 and is thus locked in position until pulled back past the projection 64. Accordingly, the bar 54 helps lock the walls 16c, 18c in the erect condition, preventing collapse of the container. There could however be other arrangements made for securing the container, in which case the bar 54 could then be allowed to move freely and selectively between the stacking and stowed positions.

[0036] Fig. 6 shows a variation of the arrangement of Fig. 5, in which the pivot axis of the bar 54b is closer to the top of the end wall 18e and in which a channel 72 is provided on the end wall 18e to receive the bar 54b flush in the wall 18e when in the stowed position. In this version, it is convenient if the walls 16e fold down first when the container is to be collapsed. A lock may be provided between the walls 16 and walls 18, or this may be provided by engagement between the bar 54b and the walls 16e.

[0037] Fig. 7 shows an arrangement in which the end wall 18d is provided with an elongate channel 66 to receive the vertical edge of the side wall 16d, with locking means in the form of a small latch 68 being provided. The top edge 70 of the end wall 18d is relatively wide, to restrict the mouth 20d sufficiently to provide a ledge on which a second type container can be stacked. It will be apparent that when a container of the type of Fig. 6 is erect, the stacking ledge is permanently provided by the edge 70.

[0038] Fig. 8 shows another variation using a bar 54c. In this arrangement, the bar has a leg 74 which, in the stowed position, extends downwardly and carries a pin (not shown) at its lower end. The pin runs in a vertical slot in the end wall 18f to allow the bar 54c to slide up and down in a vertical plane. When the bar 56c has been pulled up to the upper position, with the peg at the top of the slot, the peg may then turn in the slot to swing the bar 54c over to the position indicated in broken lines in Fig. 8, in which the bar 56c lies over the mouth 20f to provide a stacking support for a second type container above. Ears 76 at either end of the bar 56c rest in notches 78 in the top edge of the side walls 16f to help take the weight of the container above. The ears 76 may be a snap-fit into the notches 78 for added security. The oversize heads 76a of the ears 76 help retain the ears in the notches and help brace the walls 16f, 18f to prevent the container collapsing.

[0039] In variations of the arrangement of Fig. 8, the leg 74 could be enclosed within the end wall 18f. A notch or channel could be provided along the top edge of the wall 16f to receive the leg 74, when in the stack position.

[0040] Fig. 9 shows a further alternative which differs

from those previously described in that stacking surfaces are only provided in the corners of the container mouth. The container 10g of Fig. 9 is shown (Fig. 9a) with four small triangular corner pieces 80, one at each corner of the mouth 20g. These pieces 80 support the corners of a second type container, to allow it to stack above.

[0041] In common with some of the arrangements described above, the stacking pieces 80 also help brace the container to prevent collapse, as follows. Each corner piece 80 (Fig. 9b) is hinged to a side wall 16g to move from the stack position (Fig. 9b) to a raised position (Fig. 9c) in which the end wall 18g is no longer engaged. It can however be seen from Fig. 9c that the lower surfaces of the pieces 80 are provided with teeth 82 to engage notches 84 along the end walls 18g, to help lock the walls 16g, 18g together.

[0042] Once the teeth have been disengaged by raising the pieces 80 in this way, the end walls 18g can then be folded down over the base 14g, as indicated in Fig. 9d, in which one end wall is partially folded down. This reveals triangular recesses 86 in the upper corners of the side walls 16g, into which the pieces 80 can pivot down to their fully stowed position (Fig. 9e) in which they are flush with the inner face of the wall 16g. The walls 16g can then fold down in turn over the end walls 18g and base 14g to fully collapse the container.

[0043] Engagement between the pieces 80 and the end walls 18g can be modified, for instance by forming a channel 87 in the piece 80 (Fig. 9f) to be used with or without teeth 82 and notches 84 to enhance the security with which the walls are braced together.

[0044] Fig. 10 shows an arrangement in which small wedges 88 can swing out from recesses in side walls 16h to provide an upper surface 90 as a stacking surface for second type containers, and also to lock the container against collapse, by abutment of their end faces 92 with the end wall 18h. Wedges 88 can be provided at a number of different positions around the inner edge of the mouth 20h and could be of various different sizes. They could be connected together so that manipulation of one wedge 88 causes corresponding movement of at least one other wedge.

[0045] Fig. 11 shows an arrangement in which two long bars 94 are provided, each supported at one end 96 to turn about a vertical axis from a stowed position (indicated in heavy ink in Fig. 11) clear of the mouth 20j, to a stack position in which the two bars 94 extend across the mouth 20j to support a second type container stacked thereon.

[0046] Finally, Figs. 12 a,b and c show an arrangement using a stacking bar 100, similar to a conventional stacking bar. In this arrangement, the side wall 16k is intended to hinge down before the end wall 18k when the container is being collapsed. However, in the corner of the container, there is an overlap between the walls 16k, 18k, because the wall 18k has a short extension 102 running outside a flange 104 at the end of the side wall

16k. The extension 102 has two walls forming a gap 106 between, which receives a leg 108 of the bar 100. The lower end of the leg 108 carries a boss 110 having an enlarged head by which it is held captive in a slot 112 in the extension 102. The boss 110 also passes through a hole 114 in the flange 104. The hole 114 is relatively large at its lower extremity, to allow the head of the boss 110 to pass through, but relatively narrow toward its upper end, and too narrow to allow the boss to pass through.

[0047] The geometry of the leg 108, slot 112 and hole 114 are arranged so that when the bar 100 is in the stacking position (Fig. 12a and to the right in Fig. 12c), the boss 110 is pulled to the top of the slot 112 and thus cannot pass through the hole 114, thus locking the flange 104 to the extension 102 and preventing the side wall 16k folding down to collapse the container. However, when the bar 100 swings to the nesting position (Fig. 12b and to the left in Fig. 12c), the boss 110 can move down the slot 112 to the wider part of the hole 114, thus allowing the extension 102 to move past the boss 110 as the wall 16k is collapsed.

[0048] In this arrangement, corresponding mounting and locking arrangements are provided at the other end of the bar 100, and preferably a similar bar is provided at both ends of the container.

[0049] It can be seen that in each of these alternatives, a stackable container 10 which would normally only support a like container when stacked thereon, but be unable to nest with it, further comprises a stacking device of some description, which, in use, can support a container of substantially the same size in plan, and of a stackable and nestable type. In consequence, containers of the two types can be used interchangeably, at least to the extent that any container would be able to stack on any other container when the containers are full, although it might still be desired to separate the containers when empty, so that first type containers can be collapsed for return, and second type containers can be nested. Typically, although slant sided stack/nest containers can be used for many types of product, others are better suited to the vertical sides of a stack-only container. Boxes of breakfast cereals, and bottles, for instance, tend to be better accommodated in vertical sided containers.

[0050] Several of the stack members have stowed positions clear of the container mouth, which may allow a second type container to nest in a first type container, which may be desirable on some occasions.

[0051] Various combinations of pivotal and sliding movement have been described to achieve the required movement, and many other forms for achieving this could be devised, including pegs sliding in slots, saddles over flanges sliding along the flanges, and the like. The stack members can resemble bale arms or stacking bars or be in other forms, such as the triangular corner pieces of Fig. 9. In most of the arrangements, some degree of locking can be provided in the collapsible con-

tainer, to improve its rigidity when under load from above.

[0052] It is envisaged that containers of the type described can be formed from various different materials, but preferably wholly or substantially wholly from synthetic plastics materials, such as by injection moulding. They may be formed in a variety of sizes, but a preferred system would comprise containers having a plan size of about 400mm x 600mm. In addition, it is envisaged that containers could provide dual-height stacking, at least of second type containers on first type containers, in a manner like that set out in our British Patents Nos. GB 2264102 and GB 2296009.

[0053] The various arrangements described above have all involved modifications to the first type (stack-only) container to support a second type (stack-nest) container. However, it is envisaged that the base of a second type container could be adapted, for instance by providing extendable flaps or bars to bridge the gap between the base of the second type container and the lip around the mouth of the first type container, thus allowing stacking as described above.

[0054] Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. A collapsible container comprising:

a base;
four walls hingedly connected to the base to allow the container to collapse by folding the walls down onto the base;
at least one stack member attached to the container to be movable, when the container is in the erect condition, between a stacking position at which the base of a second container may be supported, and a stowed position in which a second container is not supported;
the container being collapsible when the stacking member is in the stowed position; and
the container further comprising releasable lock means to secure the walls against collapse.

2. A collapsible container according to claim 1, **characterised in that** the lock means are engaged by movement of the stack member to the stacking position.

3. A container according to claim 1 or 2, **character-**

ised in that the stacking means comprise a stack member on which the base of a second container may be supported.

4. A container according to claim 1, 2 or 3, **characterised in that** the stack member may be received within a recess in the wall of a container when in the stowed position.

5. A container according to any preceding claim, **characterised in that** the stack member is pivotally mounted on the or a container for movement between the stacking and stowed positions.

6. A container according to claim 5, **characterised in that** the stack member may pivot through substantially 270° from a position outside the container, to a position overlying the mouth of the container.

7. A container according to any of claims 1 to 4, **characterised in that** the stack member is slidably mounted on the container for movement between the stacking and stowed positions.

8. A container according to any of claims 1 to 4, **characterised in that** the stack member is mounted for movement between the stacking and stowed positions by a combined sliding and pivoting movement.

9. A container according to claim 8, **characterised in that** the stack member is mounted to move from the stowed position to the stacking position by an initial sliding phase followed by a pivoting phase of movement.

10. A container according to claim 9, **characterised in that** the sliding movement is substantially vertical.

11. A container according to claim 9 or 10, **characterised in that** the sliding phase moves the stack member to a position from which it may pivot out over the mouth of the container to provide a support surface.

12. A container according to any of claims 3 to 11, **characterised in that** the stack member is alongside the outside or outside face of a container wall in the stowed position.

13. A container according to any of claims 3 to 12, **characterised in that** the stack member extends along all or part of the periphery of the container mouth when in the stacking position.

14. A container according to any of claims 3 to 13, **characterised in that** the stack member comprises a bar or flap on which a second type container (12) may be supported.

15. A container according to any preceding claim, **characterised in that** the stack member engages another member when in the stacking position, to secure the walls as aforesaid.

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16. A collapsible container comprising:

a base;

four walls hingedly connected to the base to allow the container to collapse by folding the walls down onto the base;

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at least two opposite wall being provided each with at least one locking device movably attached to the respective wall;

each locking member being able to pivot on the corresponding wall, to move to a position in which the locking devices secure the walls against collapse.

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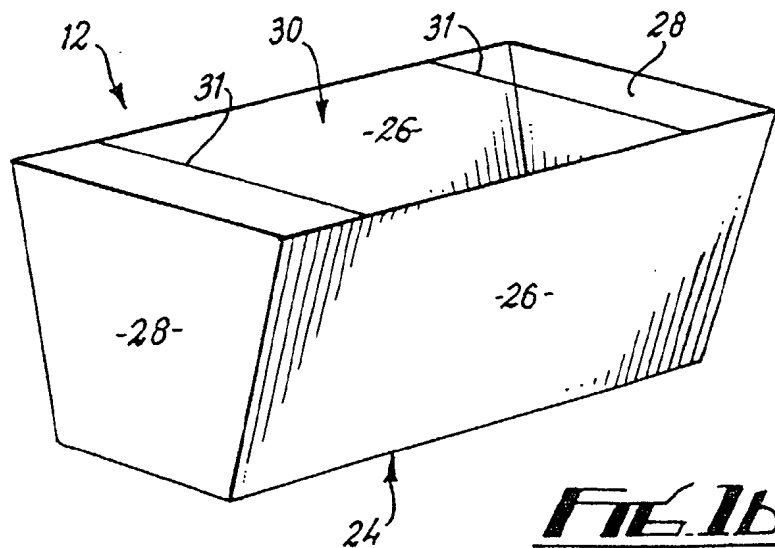
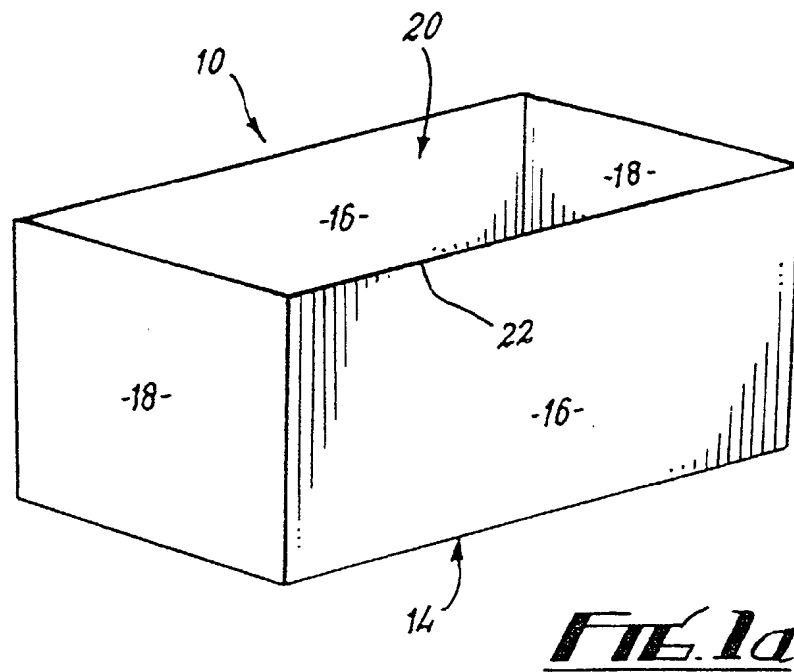
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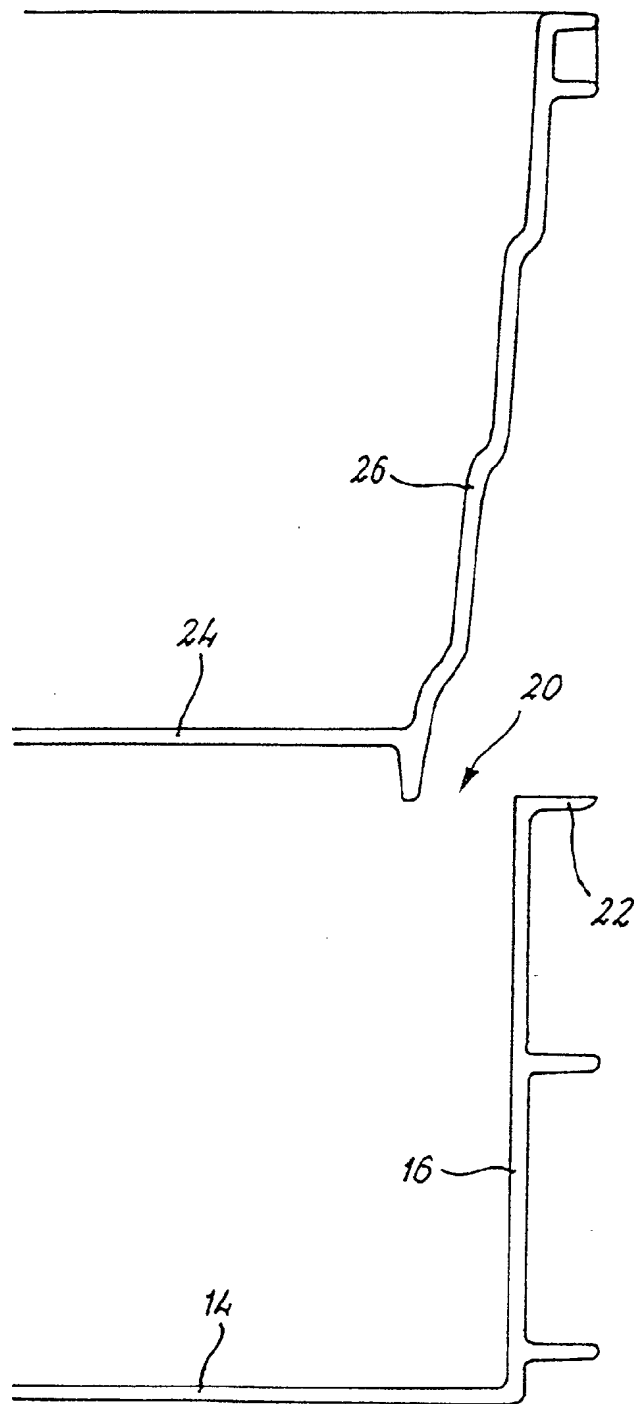


FIG. 2

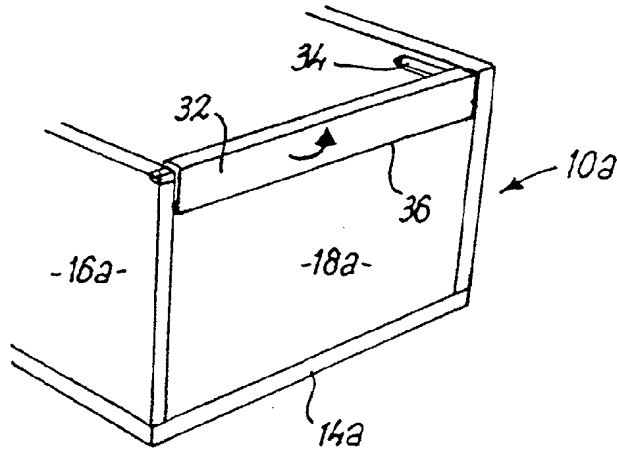


Fig. 3a

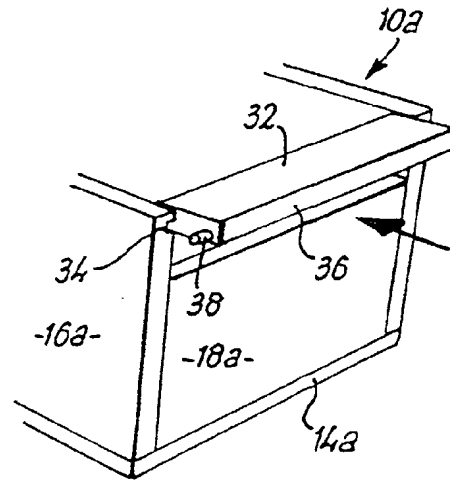


Fig. 3b

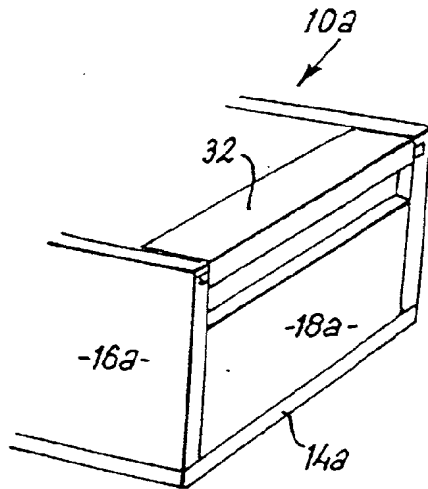


Fig. 3c

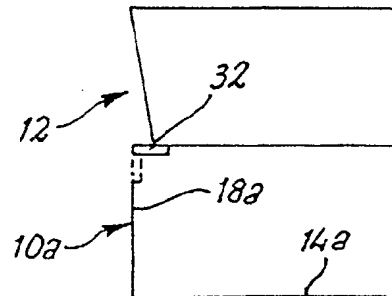
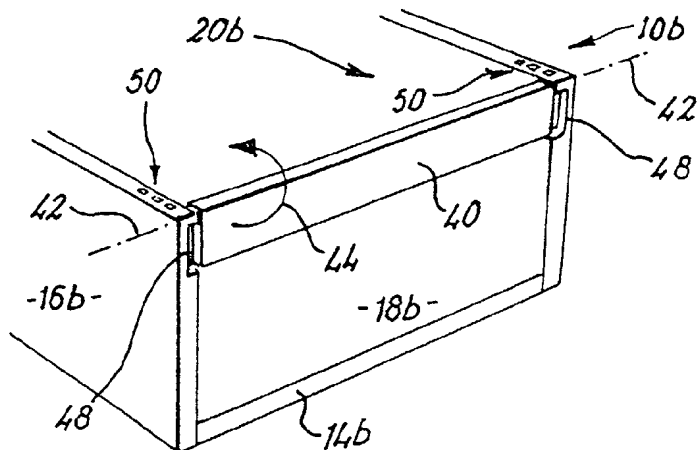
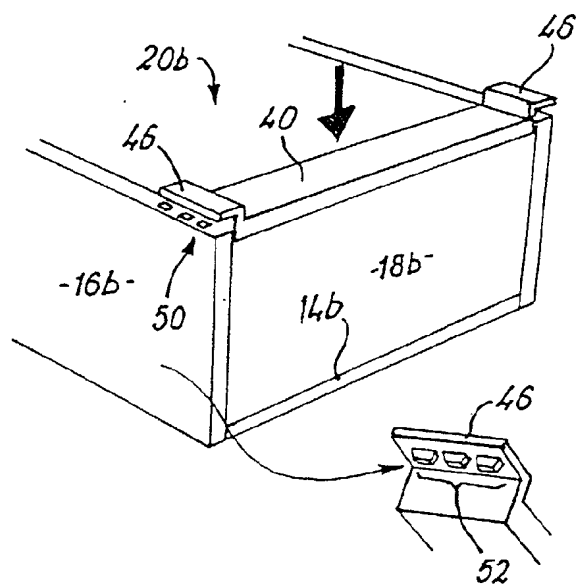


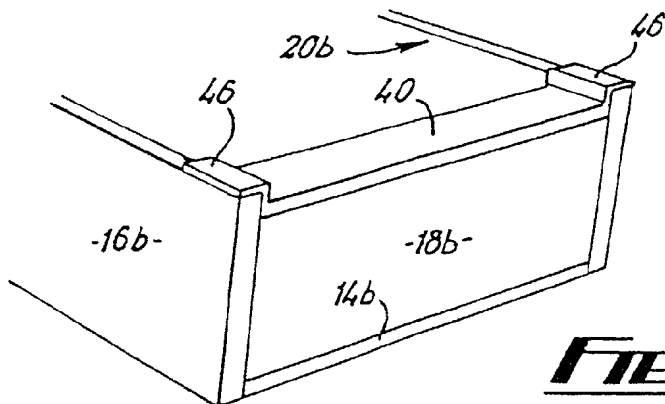
Fig. 3d



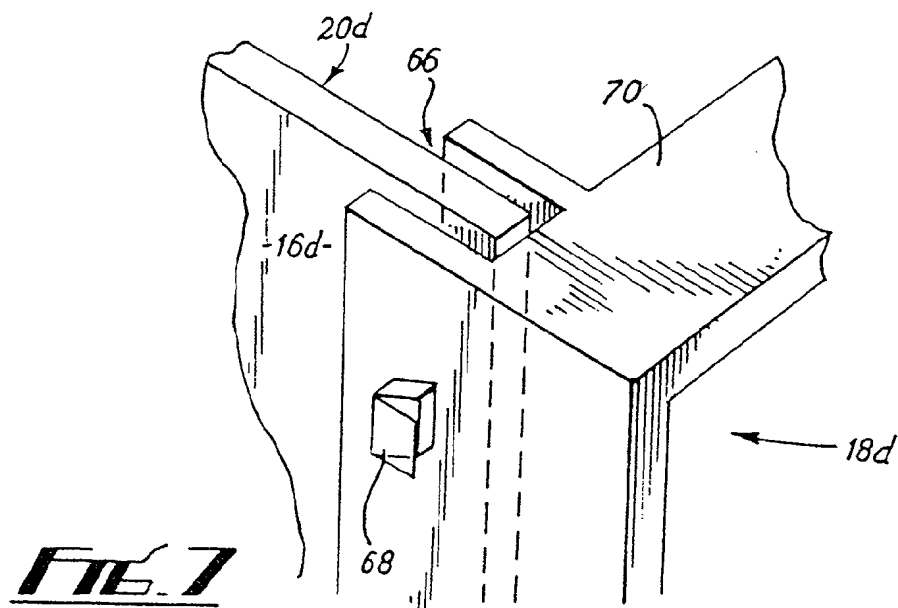
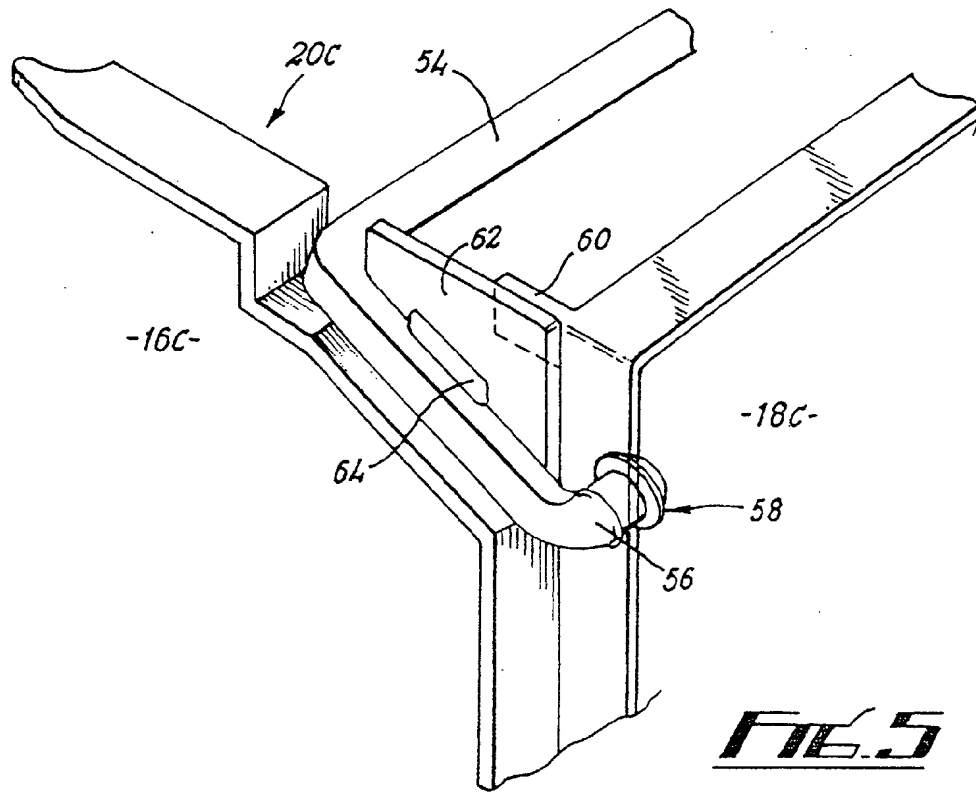
File 4a



File 4b



FTE 4c



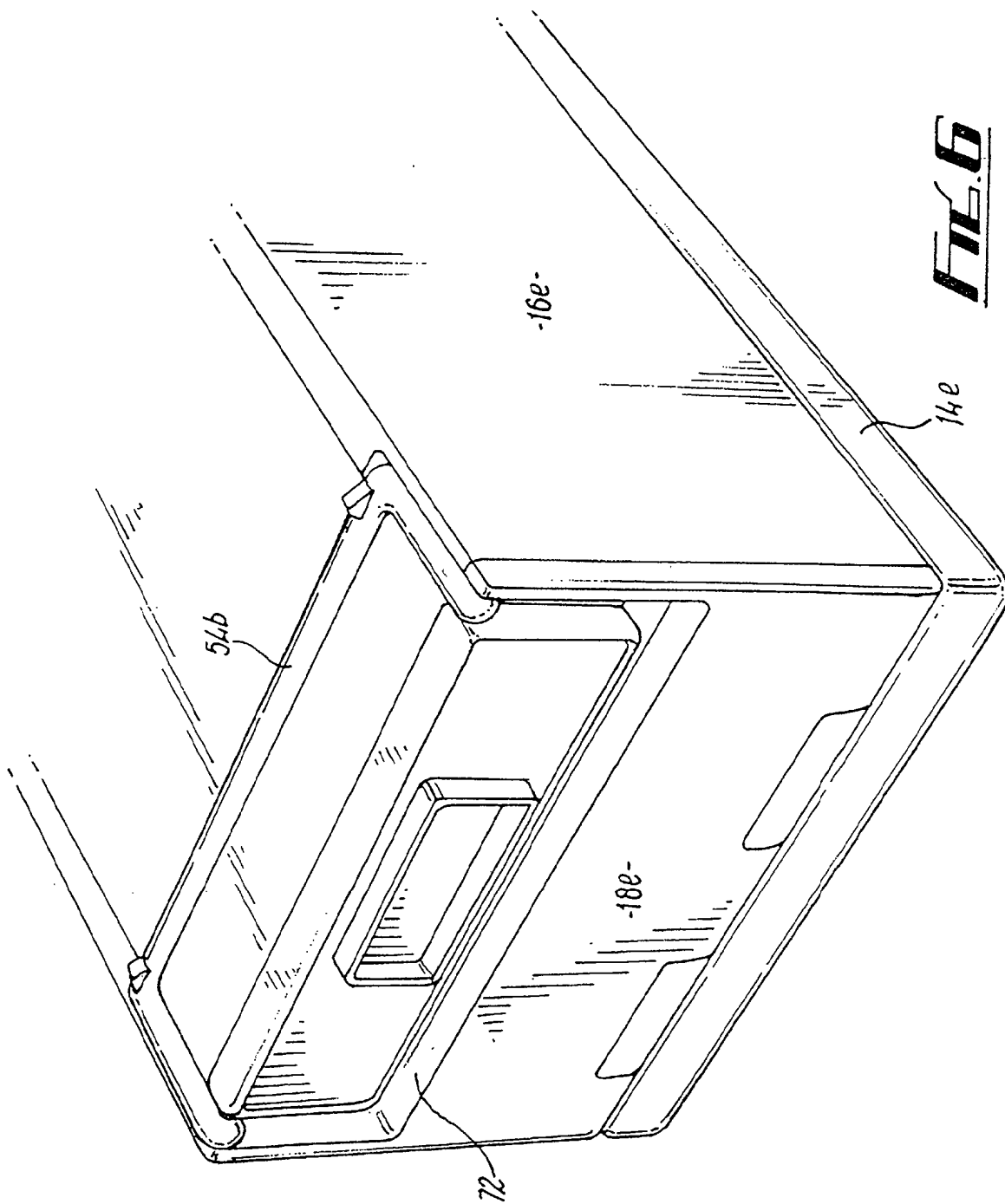


FIG. 6

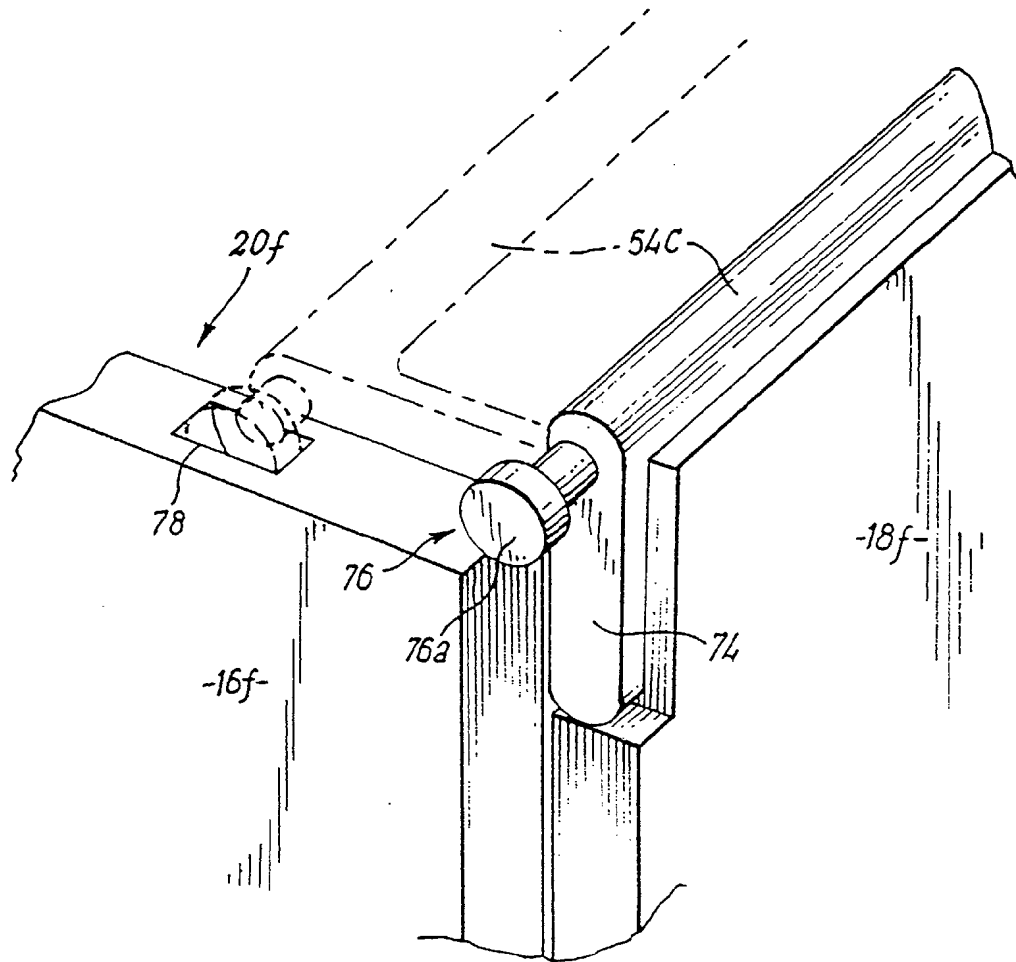
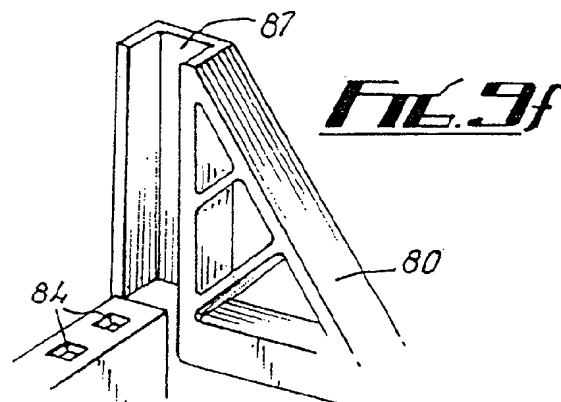
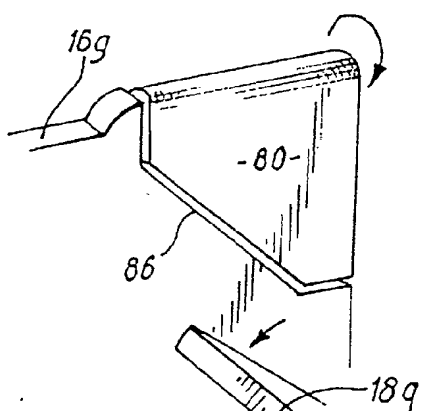
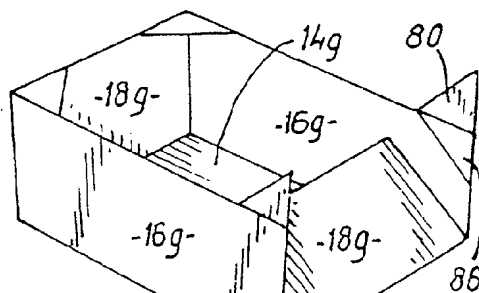
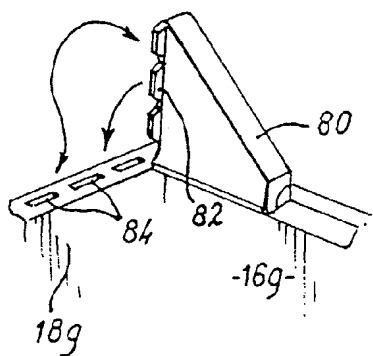
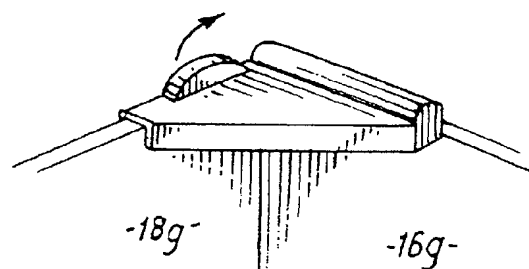
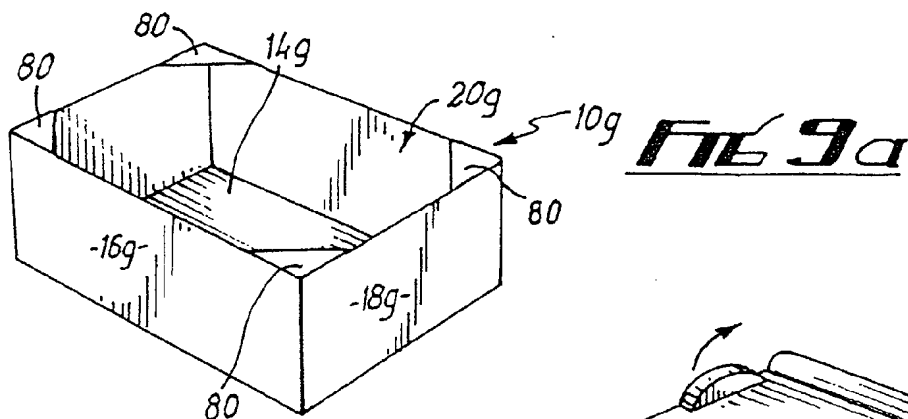


FIG. 8



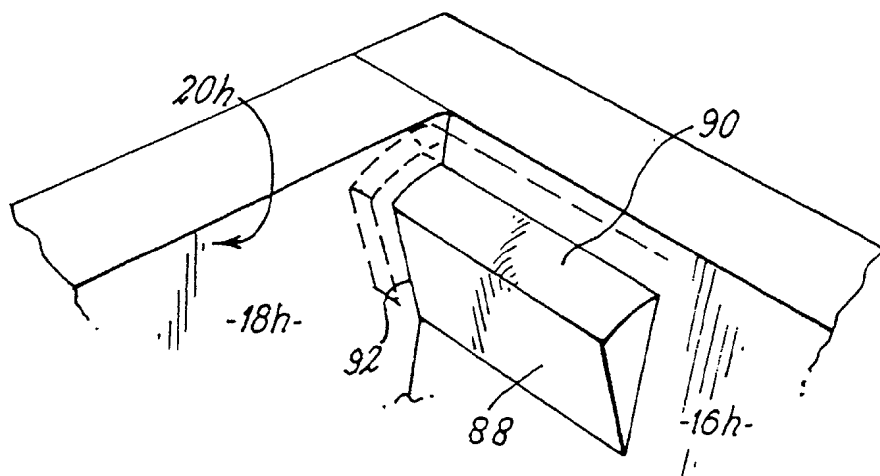


FIG. 10

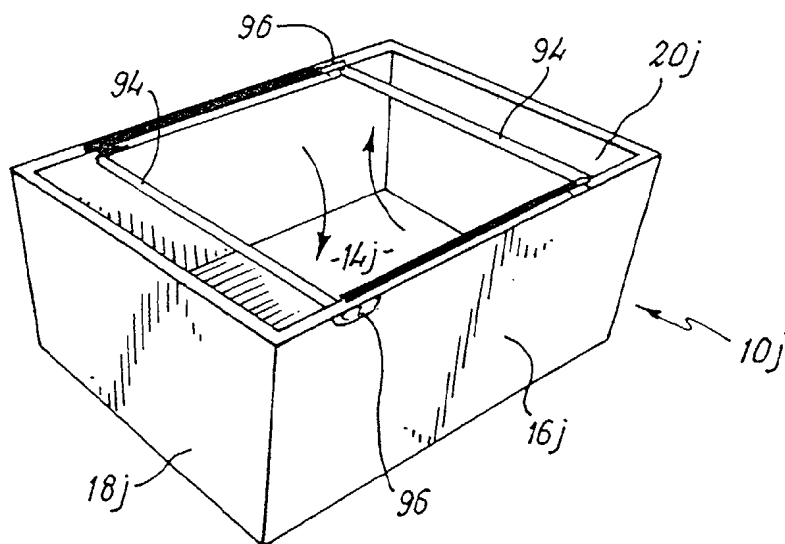
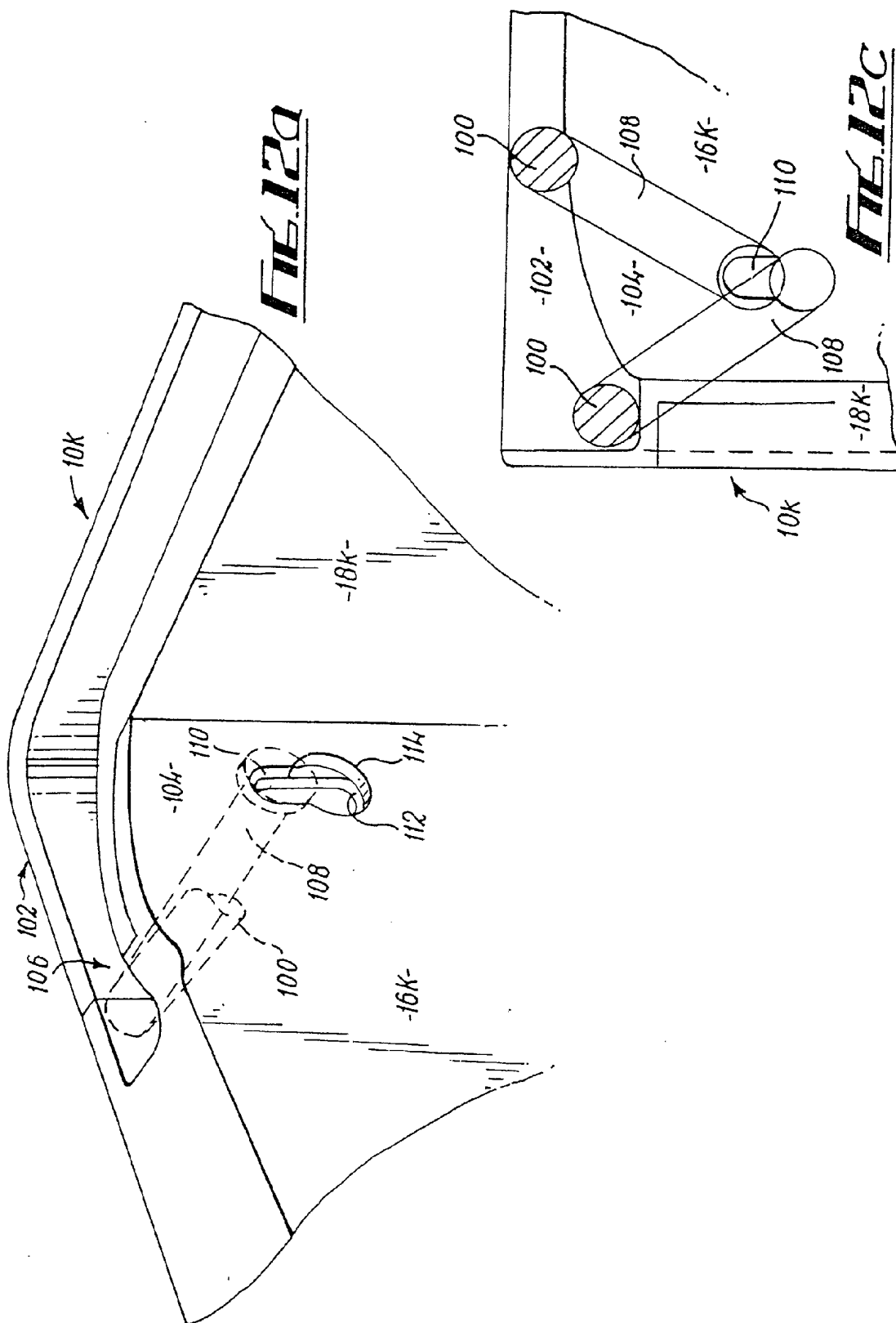
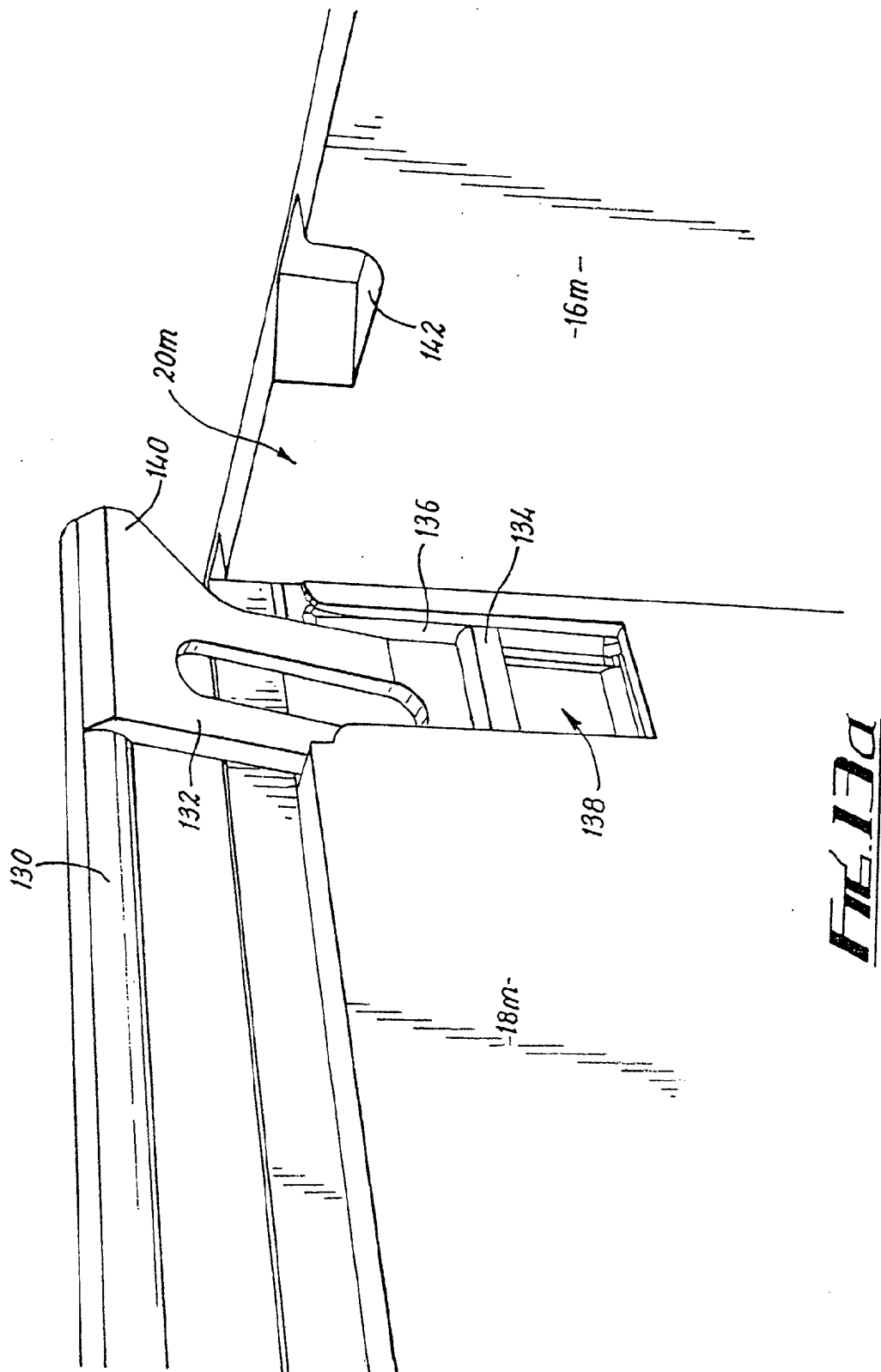
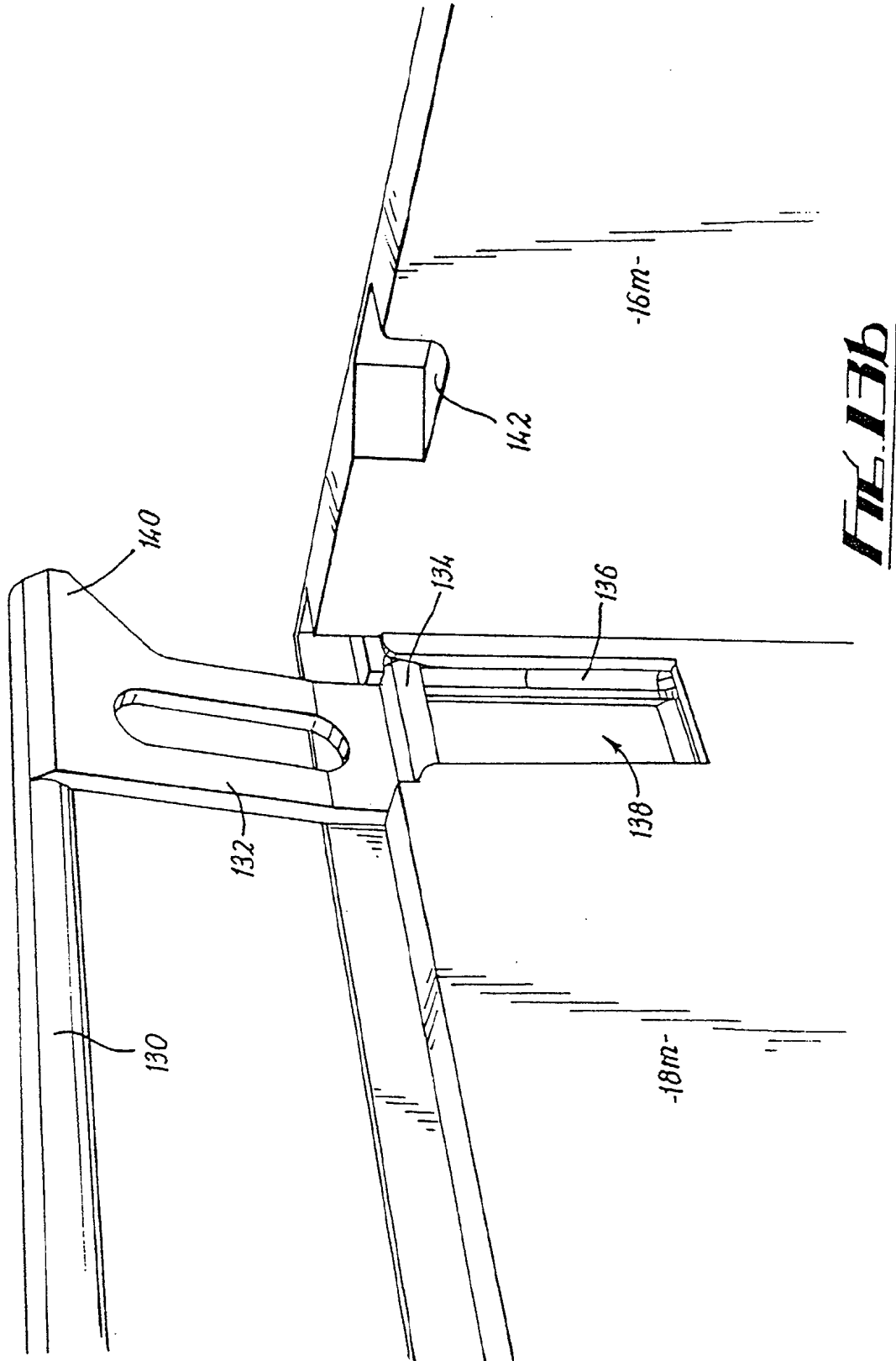
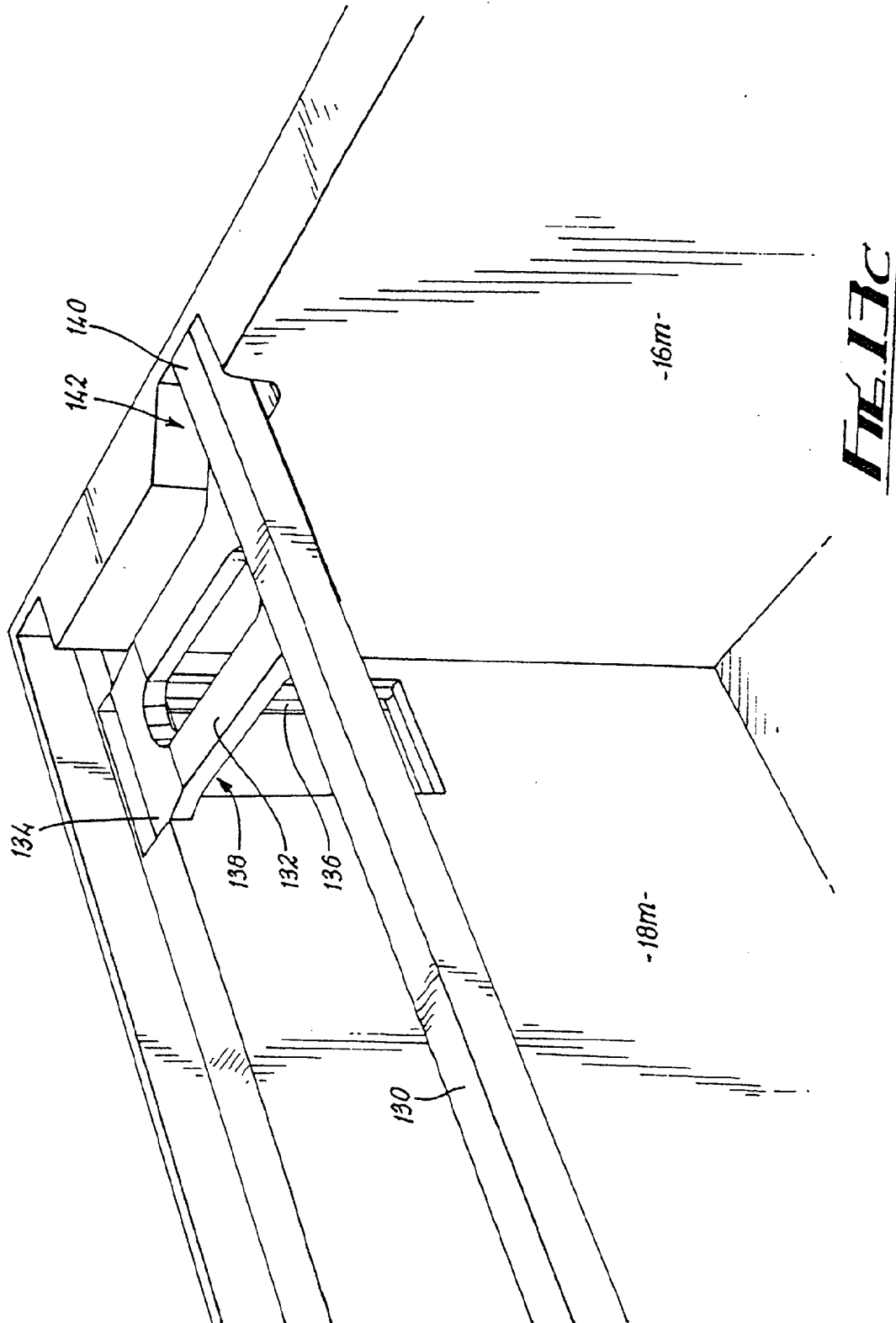


FIG. 11









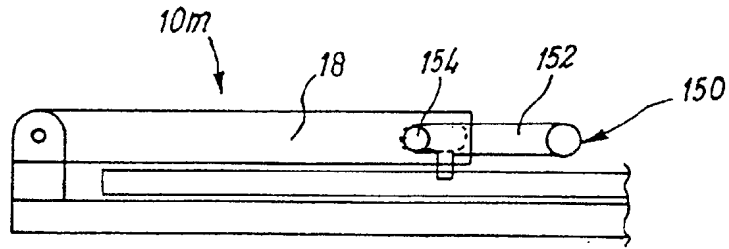


Fig. 14a

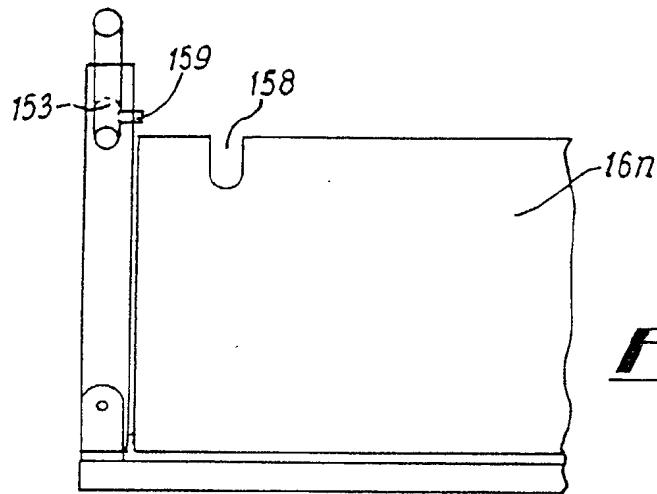


Fig. 14b

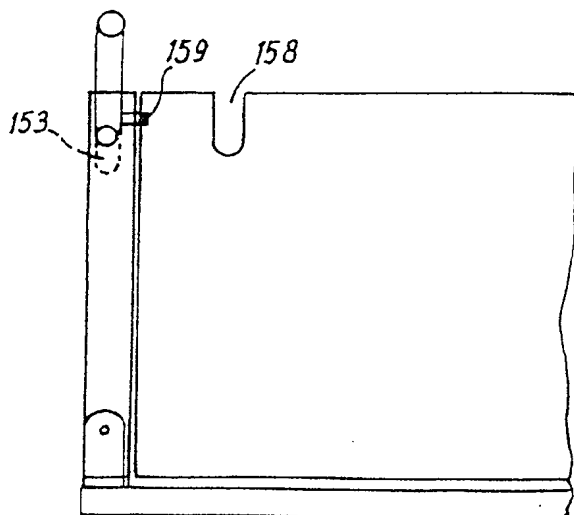


Fig. 14c

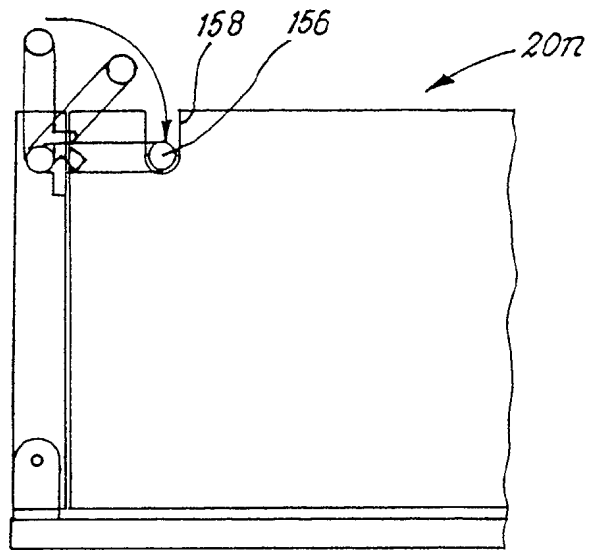


FIG. 14d

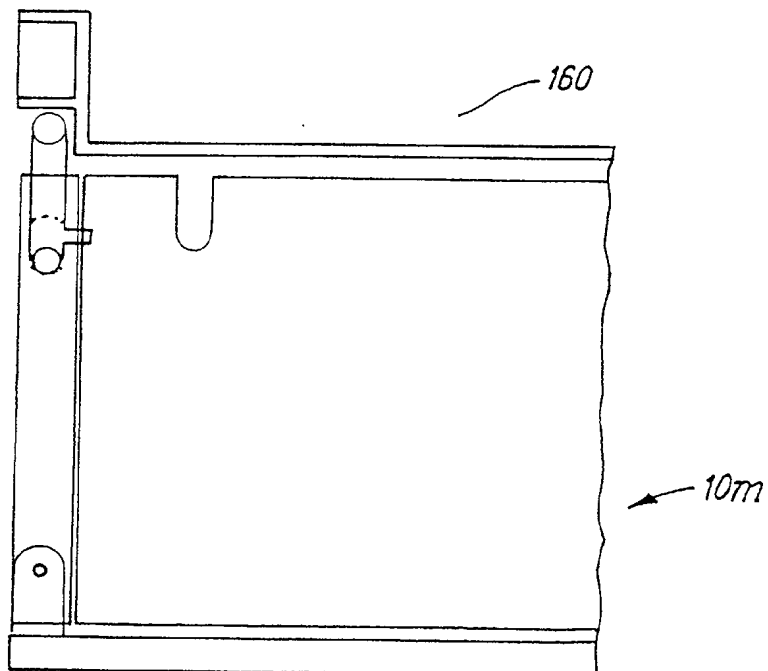


FIG. 14e

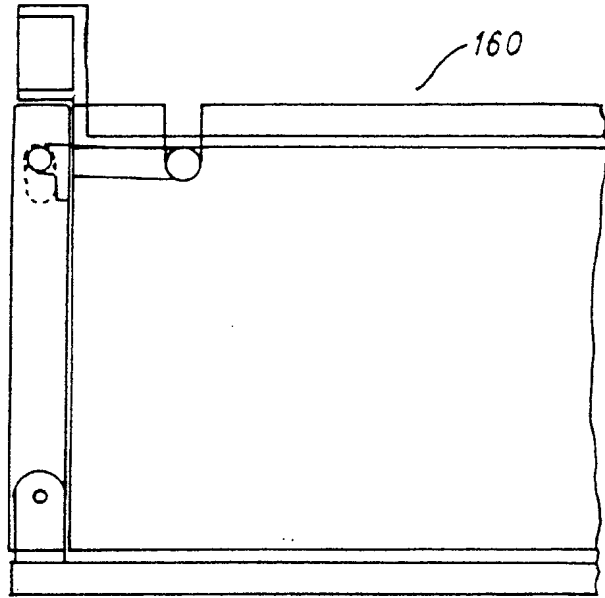


FIG. 14f

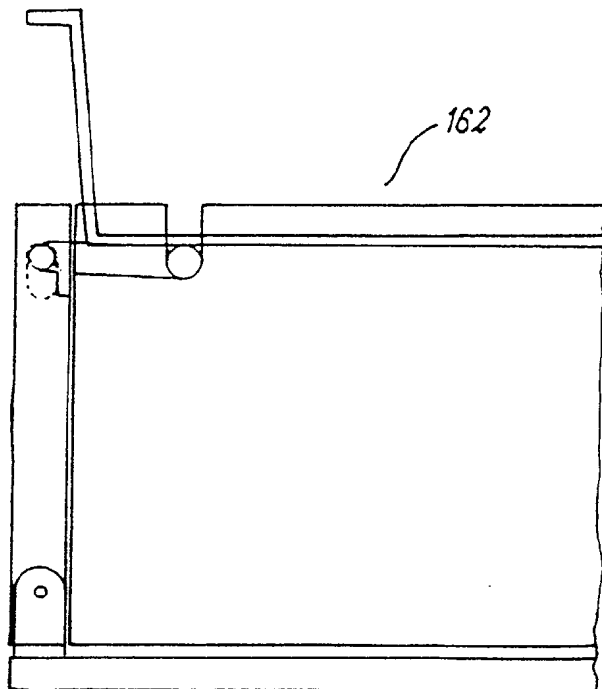


FIG. 14g



European Patent
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EUROPEAN SEARCH REPORT

Application Number
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Place of search MUNICH		Date of completion of the search 12 June 2002	Examiner Farizon, P
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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